

Geopier® Systems Beat Old Man Winter to the Punch in Four-Building Mixed-Use Development



Sherman Beltline Expansion

St. Louis Park, MN

CHALLENGE

Located just outside Minneapolis, the Sherman Beltline Expansion project required multiple ground improvement solutions to support four heavily loaded structures ranging from three to seven stories. The development included three mixed-use (apartment and retail) buildings and a parking garage, with foundation loads reaching up to 700 kips and 1,300 kips, respectively. Superior settlement control was essential due to highly compressible organic soils underlying the planned development.

Subsurface conditions varied significantly across the site, with the depth and composition of the organic deposits and underlying soft soils changing over short distances. The organic layer reached thicknesses of up to 15 feet and exhibited organic contents as high as 83% and moisture contents up to 399%. In some areas, these deposits were underlain by up to 15 feet of very soft clay and silt, while in others they extended over very loose to medium-dense sands up to 20 feet thick.

As is common in Minnesota, groundwater was encountered near the top of the organic layer, creating particularly challenging foundation conditions. Given the highly variable subsurface profile and stringent settlement requirements, deep foundations or rigid inclusion systems were the only viable solutions for supporting the proposed structures.

GEOPIER® SOLUTION

Geopier®, Ground Improvement Engineering (GIE), and Foundation Service Corp (FSC) partnered to leverage three Geopier® systems that together remediated a variety of problematic soil conditions—providing excellent support for the various structures in the development:

Geopier® Impact® System

Impact piers are a displacement system that penetrates through caving soils and allows high-quality Rammed Aggregate Piers (RAPs) to be constructed from the bottom up, in 40+-foot depths, without fouling the aggregate. The result is a dense column of aggregate surrounded by stiffened matrix soils that provide excellent settlement control and allow higher bearing capacities.

Geopier® Armorpack® System

The Armorpack® pier system is a rigid inclusion foundation system that's ideal for use with layers of soft clay or organic soils 10-15 feet thick. A patented HDPE sleeve (shell) keeps the aggregate confined to the pier and prevents it from bulging into weak matrix soils. The result is a dense column that provides excellent stiffness and settlement control.

Geopier® GeoConcrete® Column System

Geopier GeoConcrete® Columns (GCCs) are a high-capacity rigid inclusion system that combines a concrete base "bulb" with an extruded column of concrete constructed in an airtight (closed) system. This unique construction method allows for superior quality control during installation, eliminates the need for deep foundations and over-excavation, and provides excellent settlement control and high bearing capacities (8,000 psf on Building 1) in a wide range of soil conditions.



PROJECT TEAM

Developer

Sherman Associates

General Contractor

Donlar Construction

General Contractor

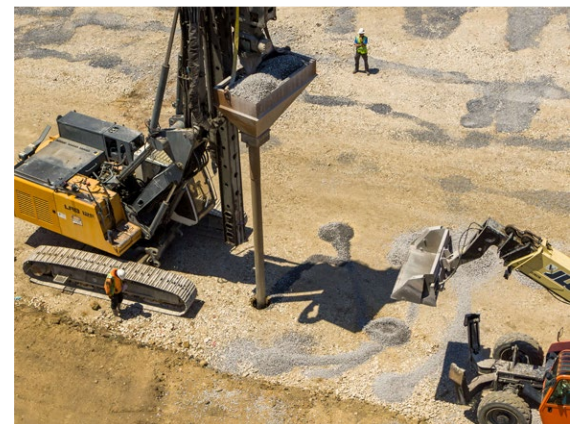
Frana Companies

Geopier Licensee

Foundation Service Corp (FSC)

Geopier Designer

**Ground Improvement Engineering
(GIE)**





RESULTS

The combined expertise of the Geopier®, GIE, and FSC teams, paired with Geopier® systems, allowed construction of the four buildings to stay on schedule in encroaching bad weather, while providing significant cost savings compared to other options.

PROJECT PERFORMANCE

4 BUILDINGS

MIXED-USE DEVELOPMENT

3 SYSTEMS

INTEGRATED GEOPIER® SOLUTION

45+ FT

GCC PIER DEPTHS

ON SCHEDULE

DESPITE WINTER WEATHER

SETTLEMENT

CONTROL

COST SAVINGS

VS. ALTERNATIVES

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